

**What is claimed is:**

- 1        1. A method for manufacturing a biochemical labeling  
2 material, comprising:  
3                providing a plurality of nanoparticles;  
4                bonding the nanoparticles to a template molecule by  
5                molecular imprinting;  
6                polymerizing the nanoparticles to form a matrix with  
7                uniformly-distributed template molecule; and  
8                removing the template molecule from the matrix to  
9                reveal a detection group of the matrix and leave  
10              a cavity with specific area.
- 1        2. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 1, wherein the  
3 nanoparticles are metal.
- 1        3. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 2, wherein the  
3 nanoparticles are Au, Ag, Ni, or Co.
- 1        4. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 1, wherein the  
3 nanoparticles are metal oxide.
- 1        5. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 4, wherein the  
3 nanoparticles are iron oxide.
- 1        6. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 1, wherein the  
3 nanoparticles are semiconductors.

1       7. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 6, wherein the  
3 nanoparticles are II - VI or III-V group semiconductors.

1       8. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 6, wherein the  
3 nanoparticles have core-shell structure of at least two  
4 semiconductors.

1       9. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 1, wherein the  
3 surface of nanoparticles is further functionalized prior to  
4 bonding with template molecules.

1       10. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 9, wherein the  
3 surface of nanoparticles is functionalized by fluorescent  
4 molecules.

1       11. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 10, wherein the  
3 fluorescent molecule is dansyl-chloride, anthracene,  
4 pyrene, coumarine, n-vinylcarbazole or derivatives thereof.

1       12. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 9, wherein the  
3 surface of nanoparticles is functionalized by electron-  
4 transfer molecules.

1       13. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 12, wherein the  
3 electron-transfer molecule is amine, porphine, fullerene,  
4 organophosphine, carotene or derivatives thereof.

1       14. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 9, wherein the  
3 surface of nanoparticles is functionalized by (3-  
4 mercaptopropyl) trimethoxy silane or (3-aminopropyl)  
5 trimethoxy silane to form a functional group thereon, able  
6 to bond to the template molecule by hydrogen bonding.

1       15. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 9, wherein the  
3 surface of nanoparticles is functionalized by (4-vinyl  
4 pyridine) or allyl mercaptothiol to form an unsaturated  
5 double-bond thereon.

1       16. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 9, wherein the  
3 surface of nanoparticles is functionalized by (3-  
4 mercaptopropyl) trimethoxy silane) or vinyl trimethoxy  
5 silane to form an unsaturated double-bond thereon.

1       17. The method for manufacturing a biochemical  
2 labeling material as claimed in claim 1, wherein a  
3 functional monomer, a crosslinking agent, and an initiator  
4 are further added during polymerization of nanoparticles.

1       18. A biochemical labeling material manufactured by a  
2 method comprising:

3              providing a plurality of nanoparticles;  
4              bonding the nanoparticles to a template molecule by  
5              molecular imprinting;  
6              polymerizing the nanoparticles to form a matrix with  
7              uniformly-distributed template molecule; and  
8              removing the template molecule from the matrix to  
9              reveal a detection group of the matrix and leave  
10             a cavity with specific area.

1        19. A biochemical labeling material as claimed in  
2 claim 18, wherein the nanoparticles are metal.

1        20. A biochemical labeling material as claimed in  
2 claim 19, wherein the nanoparticles are Au, Ag, Ni, or Co.

1        21. A biochemical labeling material as claimed in  
2 claim 18, wherein the nanoparticles are metal oxide.

1        22. A biochemical labeling material as claimed in  
2 claim 21, wherein the nanoparticles are iron oxide.

1        23. A biochemical labeling material as claimed in  
2 claim 18, wherein the nanoparticles are semiconductors.

1        24. A biochemical labeling material as claimed in  
2 claim 23, wherein the nanoparticles are II - VI or III-V  
3 group semiconductors.

1        25. A biochemical labeling material as claimed in  
2 claim 23, wherein the nanoparticles have core-shell  
3 structure of at least two semiconductors.

1        26. A biochemical labeling material as claimed in  
2 claim 18, wherein the surface of nanoparticles is further  
3 functionalized prior to the bonding with template molecule.

1        27. A biochemical labeling material as claimed in  
2 claim 26, wherein the surface of nanoparticles is  
3 functionalized by fluorescent molecule.

1        28. A biochemical labeling material as claimed in  
2 claim 27, wherein the fluorescent molecule is dansyl-  
3 chloride, anthracene, pyrene, coumarine, n-vinylcarbazole  
4 or derivatives thereof.

1        29. A biochemical labeling material as claimed in  
2 claim 26, wherein the surface of nanoparticles is  
3 functionalized by electron-transfer molecule.

1        30. A biochemical labeling material as claimed in  
2 claim 29, wherein the electron-transfer molecule is amine,  
3 porphine, fullerene, organophosphine, carotene, or  
4 derivatives thereof.

1        31. A biochemical labeling material as claimed in  
2 claim 26, wherein the surface of nanoparticles is  
3 functionalized by (3-mercaptopropyl) trimethoxy silane or  
4 (3-aminopropyl) trimethoxy silane to form a functional  
5 group thereon, able to bond to the template molecule by  
6 hydrogen bond.

1        32. A biochemical labeling material as claimed in  
2 claim 26, wherein the surface of nanoparticles is  
3 functionalized by (4-vinyl pyridine) or allyl mercaptothiol  
4 to form an unsaturated double-bond thereon.

1        33. A biochemical labeling material as claimed in  
2 claim 26, wherein the surface of nanoparticles was  
3 functionalized by (3-mercaptopropyl) trimethoxy silane) or  
4 vinyl trimethoxy silane to form an unsaturated double-bond  
5 thereon.

1        34. A biochemical labeling material as claimed in  
2 claim 18, wherein a functional monomer, a crosslinking  
3 agent, and an initiator are further added during  
4 polymerization of nanoparticles.